800130 fr

U.S. Geological Survey Open-File Report 83-422

High-Resolution Seismic Profiles and Sidescan-Sonar Data Collected During June 1980 Offshore New Jersey, Whitefoot Cruise 80-1.[1]

Charles E. McClennen, Colgate University, Hamilton, NY 13346

This survey (888 km), of the New Jersey nearshore area, extended between Corson Inlet to the south and Manasquan Inlet to the north and from about 8 m depth to about 25 m depth (Fig. 1). The lines were located between latitudes 39° and 40°10'N and longitudes 73°50' and 74°40'W. High-resolution seismic-reflection data were collected using an EG&G Uniboom (400-4000 Hz) and an ORE Model 1035 (3.5 kHz) subbottom profiling system in conjunction with a Klein Sidescan Sonar System (100 kHz). While the quality of the data is variable, it is virtually all usable and generally of good quality but rarely excellent. Due to equipment failure, only 880 km of 3.5 kHz and 796 km of sidescan-sonar data were recorded. Navigation was by Loran-C. and fixes were recorded at 5-minute time intervals with some gaps in the data.

Analysis of the sidescan-sonar data shows five recognizable features in the study area (Fig. 2). Megaripples (2-3 m crestal spacing) were recorded almost exclusively on coast parallel tracklines, and were most abundant at distances of 10 to 20 km offshore. Nonlinear light and dark patches were abundant in the northern half of the study area and offshore to the south. Two groups of linear light and dark bands were observed as being clearly parallel or oblique to the bathymetric contours and were noted throughout the survey area. Trawl marks were noted on only one line near the shore, just north of Barnegat Inlet.

These observations indicate widespread, perhaps frequent, movement of the surface sands on the Inner New Jersey continental shelf. Directions of sediment transport are suggested by the orientation of the alternating light and dark bands and the ripples, assuming a parallel and/or transverse relative movement. Asymmetry of the ripples was not observed on the sidescan sonographs.

The high-resolution seismic-reflection profiles indicate three distinct types of subbottom stratigraphy in the top 20 to 40 m of sediment (Fig. 3). Reflectors in the area north of Barnegat Inlet dip gently (<1°) to the south-southeast. The thirty plotted reflectors are 5 to 12 m apart (vertically), are essentially parallel, and are truncated on the updip (northern) limits where they outcrop or subcrop (under a 2-4 m overburden). Truncated by erosion, they are the dominant cause of N65° east-striking topographic ridges in this offshore region. The age of the reflectors is inferred to be Tertiary from the strike and dip, which are the same as the Tertiary beds of adjacent New Jersey.

---

[1]This report is preliminary and has been reviewed for conformity with the U.S. Geological Survey Editorial Standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S.G.S.

Just to the northeast of Barnegat Inlet is a transition zone about 2 km wide in which one cannot identify or trace reflectors with any confidence. South of the transition zone, the study area is typified by horizontal to gently undulating parallel reflectors. The surface topography of ridges and swales truncates some of the reflectors, indicating postdepositional erosion. In the subsurface, filled river-valley or tidal-inlet channels also truncate the deeper flat-lying reflectors. Such channels are observed on numerous profile lines clustered to the southeast of Great Egg Inlet and Little Egg Inlet. Another channel was observed at the eastern limit of the survey, southeast of Barnegat Inlet.

The 4 to 8 m of sediments overlying the valley/channel features suggest that the subbottom depressions predate the most recent Holocene transgressive deposits and that they are a relict feature. The maximum thickness of presently active surface sediments is inferred from the overburden on the inclined Tertiary beds in the north (0 to 4 m of post-Tertiary deposits) and the overburden above the buried valley/channels in the south (4 to 8 m of post-channel-fill deposits). In some places megaripples indicate a minimum thickness of recent sediment mobility of about one meter.

The original data may be examined at the U.S. Geological Survey offices in Woods Hole, Mass. Copies of the data can be purchased only from the National Geophysical and Solar-Terrestrial Data Center, NOAA/EDIS/NGSDC, Code D621, 325 Broadway, Boulder, CO 80303 (303-497-6338).

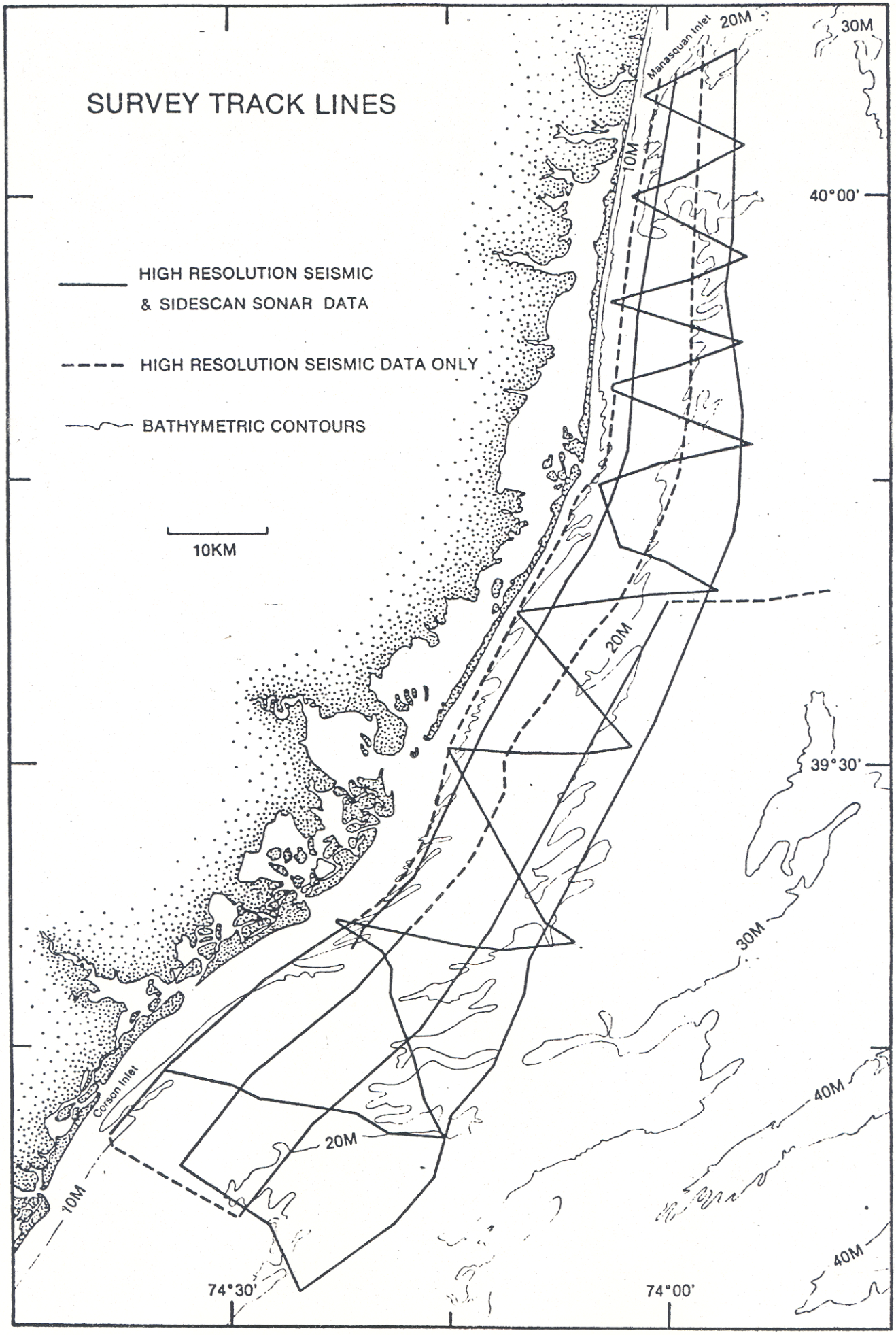
SURVEY TRACK LINES
HIGH RESOLUTION SEISMIC
& SIDESCAN SONAR DATA
HIGH RESOLUTION SEISMIC DATA ONLY
BATHYMETRIC CONTOURS
10KM
Manasquan Inlet
Barnegat Inlet
Corson Inlet
10M
20M
30M
40M
40°00'
39°30'
74°30'
74°00'

Fig. 1

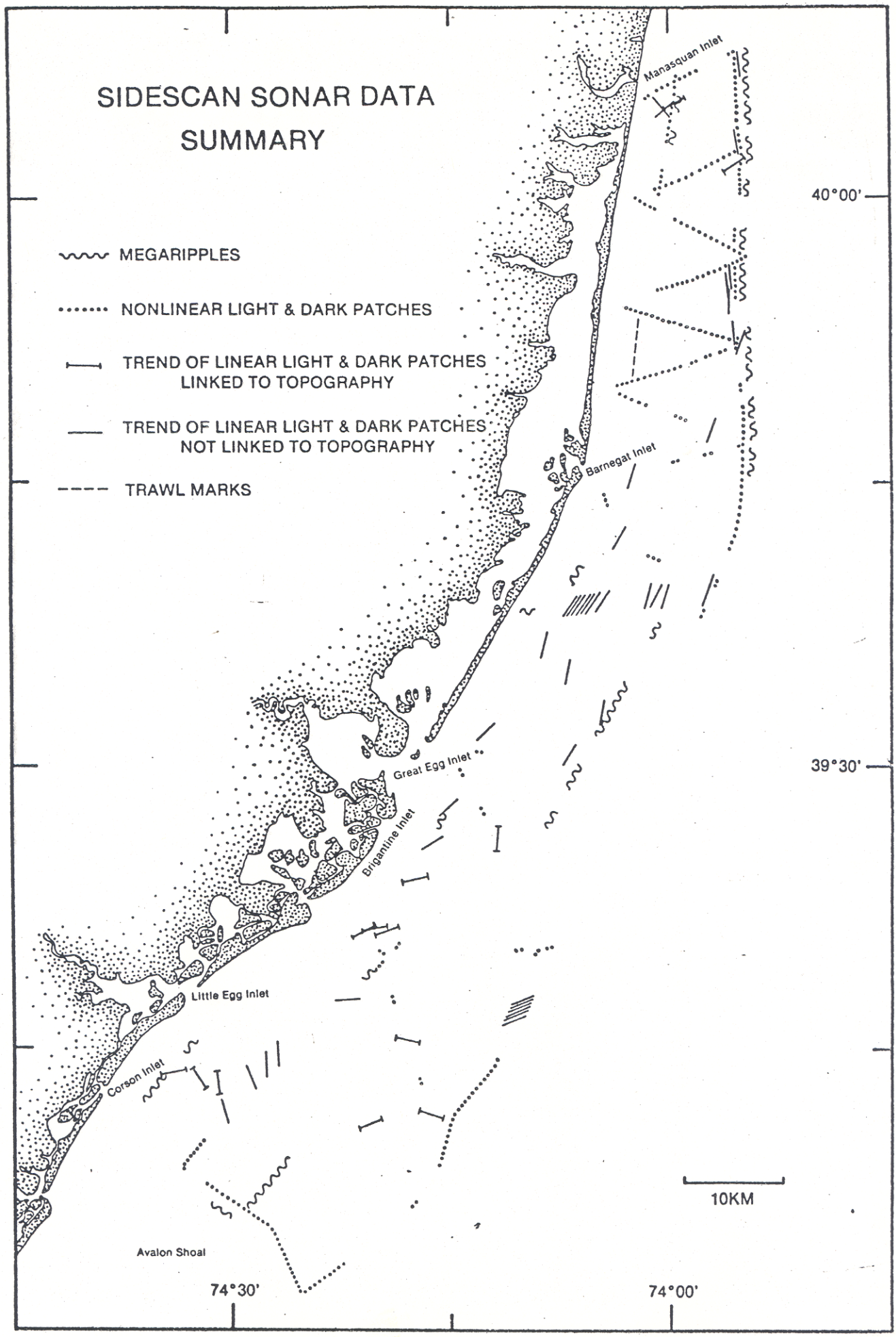
SIDESCAN SONAR DATA
SUMMARY
MEGARIPPLES
NONLINEAR LIGHT & DARK PATCHES
TREND OF LINEAR LIGHT & DARK PATCHES LINKED TO TOPOGRAPHY
TREND OF LINEAR LIGHT & DARK PATCHES NOT LINKED TO TOPOGRAPHY
TRAWL MARKS
Manasquan Inlet
Barnegat Inlet
Great Egg Inlet
Brigantine Inlet
Little Egg Inlet
Corson Inlet
Avalon Shoal
40°00'
39°30'
74°30'
74°00'
10KM

Fig. 2

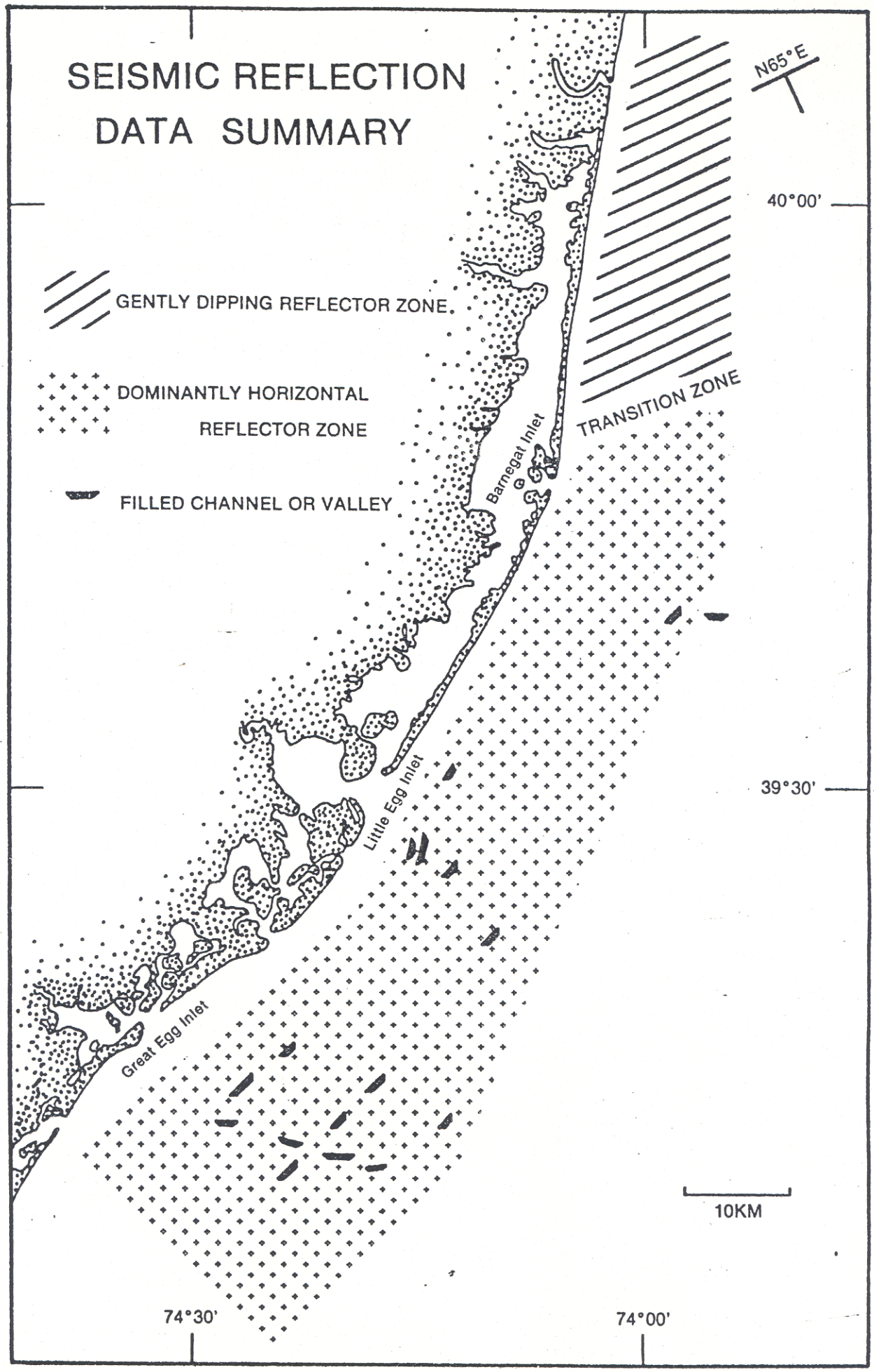
SEISMIC REFLECTION
DATA SUMMARY
N65°E
40°00'
GENTLY DIPPING REFLECTOR ZONE
DOMINANTLY HORIZONTAL
REFLECTOR ZONE
FILLED CHANNEL OR VALLEY
TRANSITION ZONE
Barnegat Inlet
Little Egg Inlet
Great Egg Inlet
39°30'
10KM
74°30'
74°00'

Fig. 3